

Diyala University

Architecture Department


Architect and Environment

Ass. Teacher Firas Gh. Altamemi

4<sup>th</sup> stage

1<sup>st</sup> lecture.

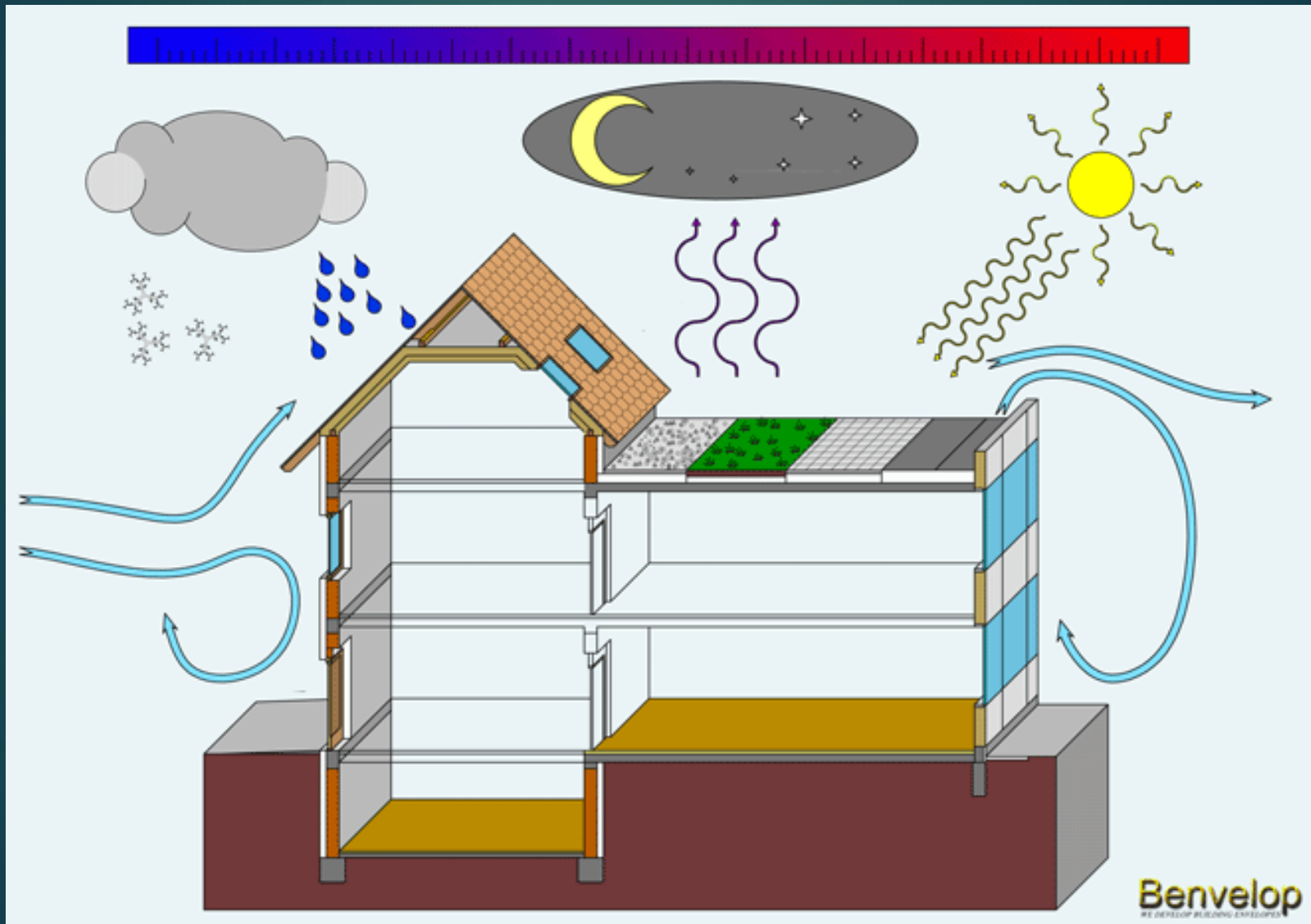
# Introduction to Architecture and Environment



The primary functions of all buildings is to adapt to the prevailing climate and provide an internal/external environment that is comfortable to the occupants.

The term (climatic design) or (solar architecture) refers to an approach to building design that is sensitive to Nature and takes advantage of climatic conditions to achieve human comfort rather than depending on artificial energy that is both costly and


# Building Envelop



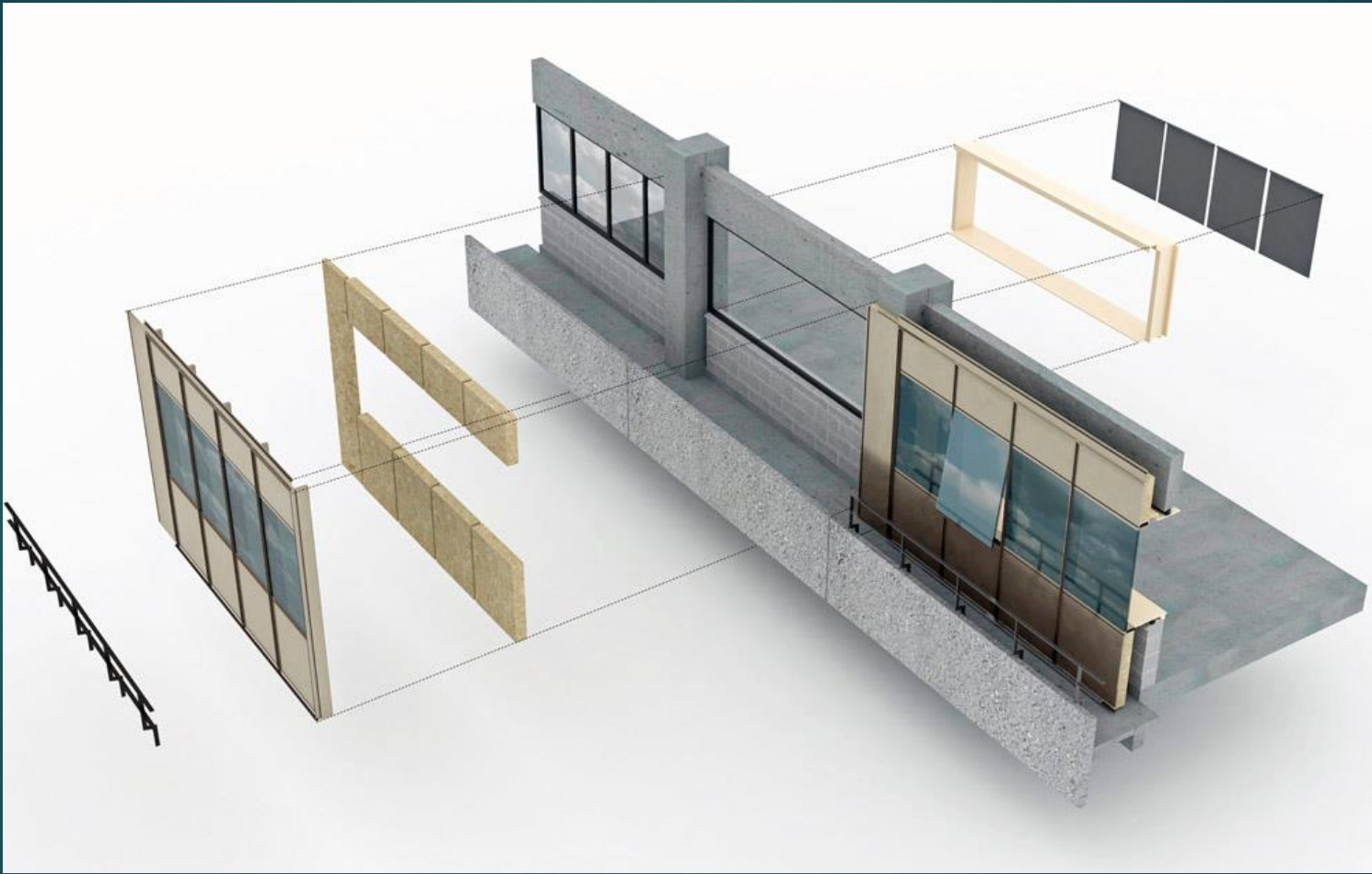
# Building Envelop



The envelope of a building is comprised of the surfaces that separate the inside from the outdoors. The design and construction of the envelope of a building can have a significant effect on the building's comfort and energy consumption.



How can you make  
design decisions  
that can improve  
the overall comfort  
and energy  
performance of the  
building envelope?



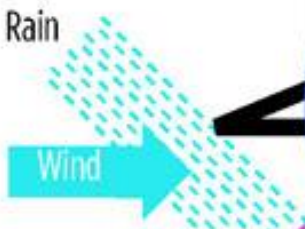
**Exterior Environment:**

Temperature,  
Relative humidity,  
Air pressure

Rain



Rain



Wind



Air leakage

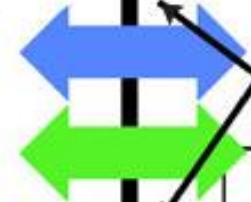


Solar radiation

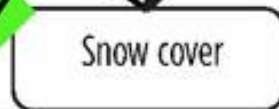


**Interior Environment:**

Temperature,  
Relative humidity,  
Air pressure



Snow cover



**Soil Environment:**

Temperature,  
Relative humidity [about 100% for soil]

Mechanical Equipment

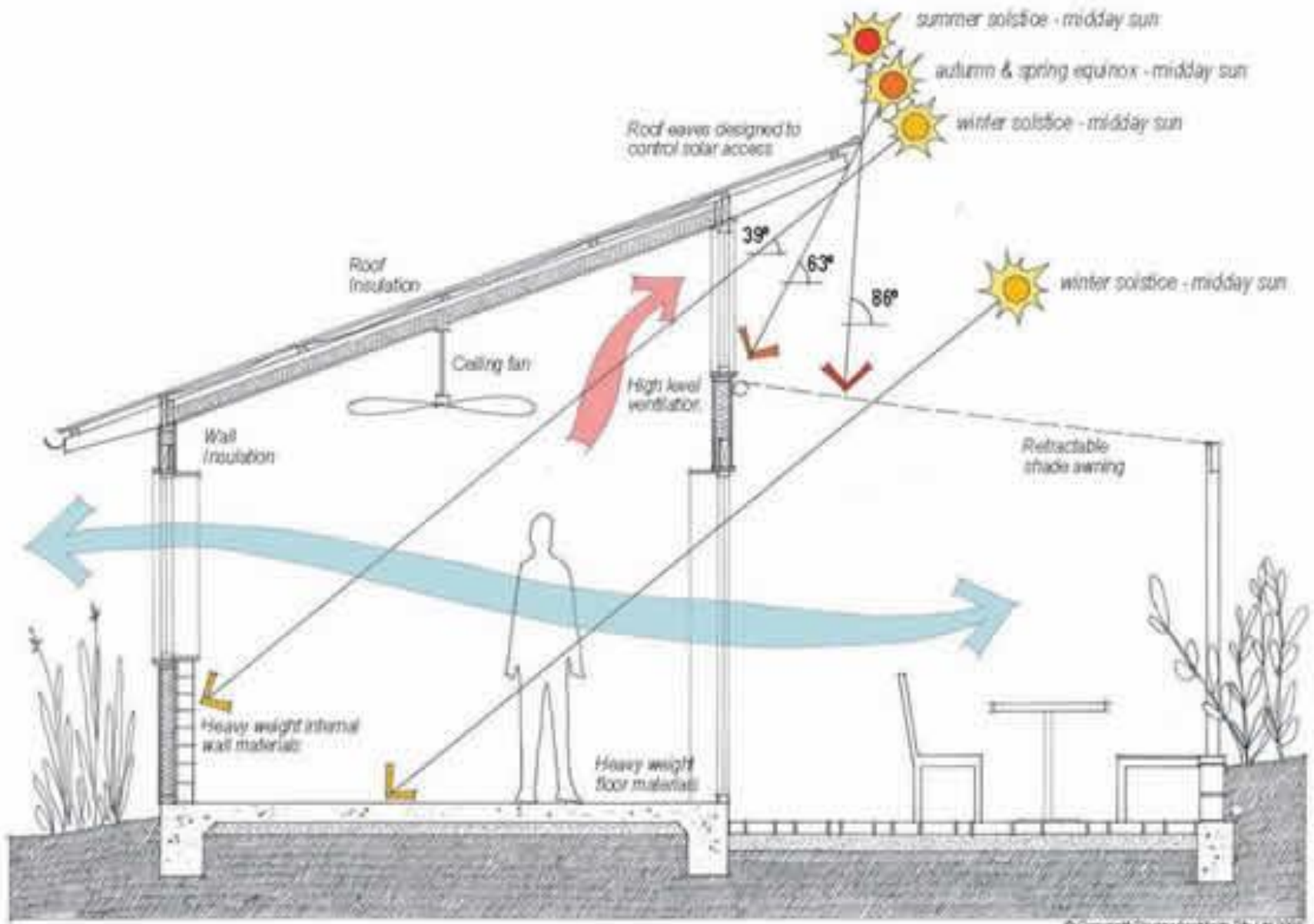


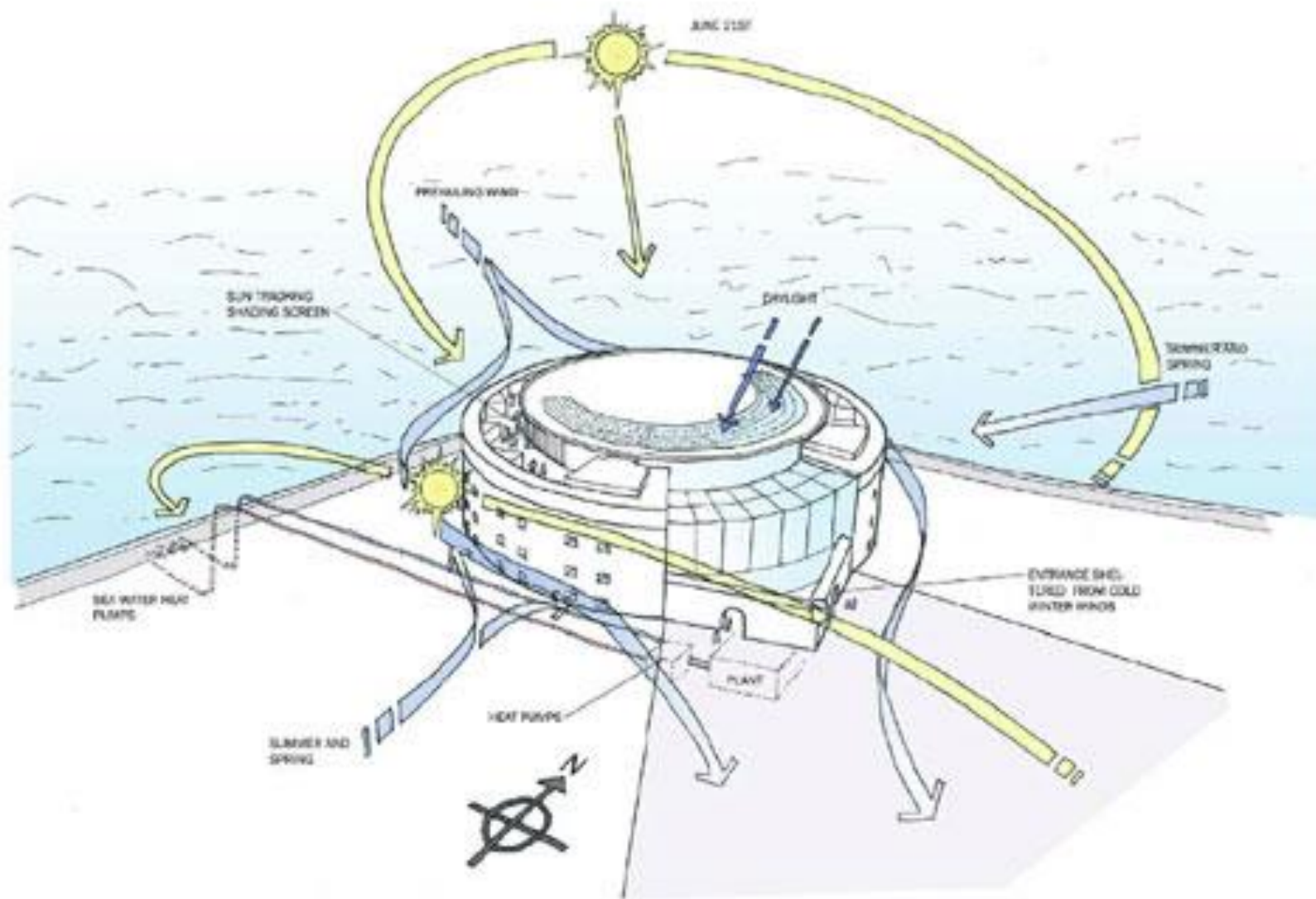
Occupant activities

**Figure 2** Environmental loads of building envelope

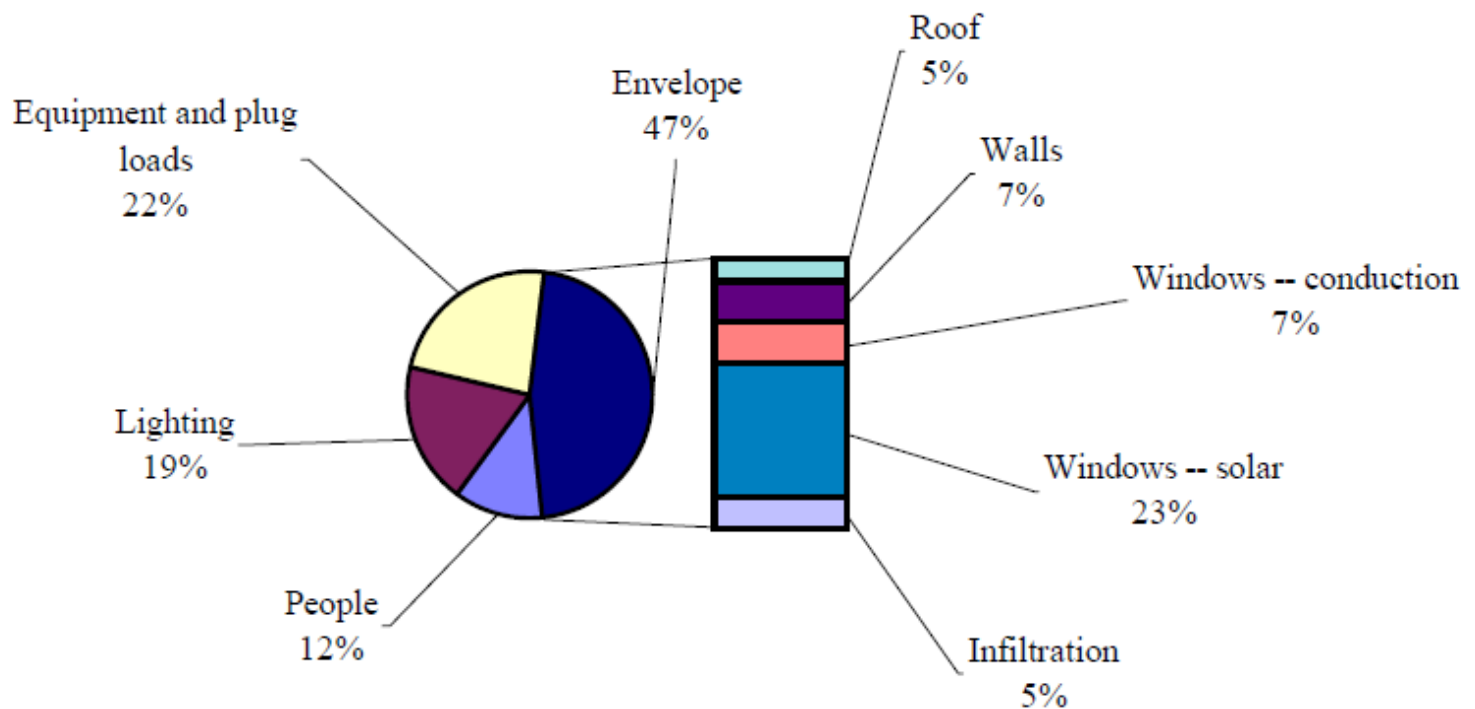
► Load: Vapour pressure difference    ► Load: Air pressure difference    ► Load: Temperature difference








## Cooling Load Components for a Typical 10,000 Square Foot Office Building





In general, buildings must  
designed to withstand  
probable combinations of  
climatic extremes and to  
make indoor conditions  
comfortable and healthful  
regardless of weather  
conditions outside

# Main axes of this subject

**Thermal Control**

1<sup>st</sup> Course

**Natural Ventilation**

2<sup>nd</sup> Course

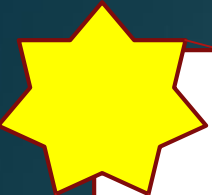
**Daylight**



▣ Comfort Level

▣ Outside condition

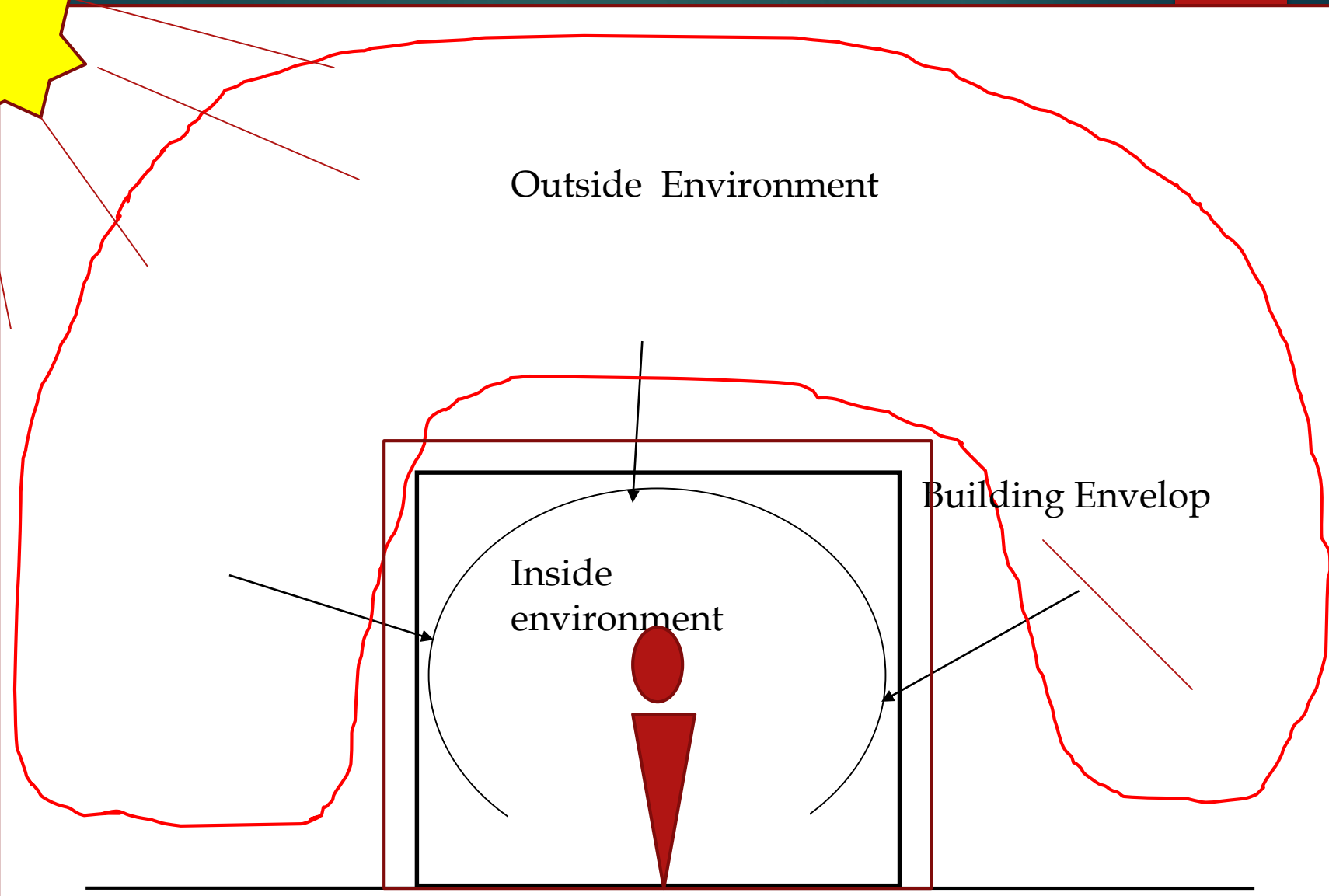
▣ Building Envelop Design



Outside Environment

Building Envelop

Inside environment



# References:

- Koenigsberger, Ingersoll, “Manual of Tropical Housing and Building, Part 1, Climatic Design”, London, 1980.
- Edward mazria, “ the passive solar energy book” 1980
- Olgyay, V., “Design With Climate”, Princeton University Press, 1969.
- Markus, T.A. & Morris, E.N., “Building, Climate and Energy”, Pitman Press Ltd, 1980.